Last Lecture Summary

- **Relational Database Design**
- **Features of good database design**
- **Reasons for bad database design:**

  Redundancy

  Unavailability of data

  Anomalies – insert / delete / update

Normalization

- Normalization is a database design technique which is used to organize the tables in such a manner that it should reduce redundancy and dependency of data.
- It divides larger tables to smaller tables and links these smaller tables using their relationships.

- Types of Normalization-
  - First Normal Form (1NF)
  - Second Normal Form (2NF)
  - Third Normal Form (3NF)
  - Boyce-Codd Normal Form (BCNF)
  - Fourth Normal Form (4NF)

Decomposition

Definition -

The decomposition of a relation schema

$R = \{A1, A2, ..., An\}$

is its replacement by a set of relation schemes

$\{R1, R2, ..., Rm\}$

such that

$Ri \subseteq R$ for $1 \leq i \leq m$

and $R1 \cup R2 \cup .... \cup Rm = R$

Decomposition Example

R = { Emp_no, name, salary, branch_no, branch_add}

Decompose into

R1 = {Emp_no, name , salary}

R2 = {branch_no, branch_add}

Where R1⊆ R and R2⊆ R and R1∪ R2 = R

Decomposition Example

STDINF ={Name,Course,Ph_No,Major,Prof,Grade}

Decompose

Student = {Name, Ph_No, Major}

Teacher = {Course, Prof }

Course = {Name, Course, Grade}